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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/545,549	04/07/2000	Tomoyuki Hirano	P00,0253	1881

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EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

9

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 09-545549	Applicant(s) Hirano et al
Examiner George Goudreau	Group Art Unit 1763

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on 10-02 (Ce - paper # 8)
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-4 is/are pending in the application.
- ☐ Of the above claim(s) is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-4 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☒ All ☐ Some* ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

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15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

16. Claims 1-2, and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamamoto (6,413,833).

Yamamoto discloses a process for making a capacitor which is comprised of the following steps:

-A SiO₂ layer (11) is formed onto the surface of a Si wafer (10).;

-After etching a hole (11 a) in the SiO₂ layer (11), an amorphous Si layer (14) is formed inside the hole in the SiO₂ layer (11).;

-A SiO₂ layer (12) is formed onto the resulting structure formed above.;

-Holes (13 b) are formed in the SiO₂ layer (12).;

-A P doped amorphous Si layer (13) is conformably formed onto the surface of the wafer.;

-A CVD SiO₂ layer (17) is used to planarize the surface of the wafer.;

-The CVD SiO₂ layer (17), and the top portion of the amorphous Si layer (13 a) are etched back.;

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- The SiO₂ layer (12) is wet etched to leave behind a cylindrical electrode comprised of P doped amorphous Si (13 b).;
- The cylindrical amorphous Si electrode (13 b) is wet etched in a solution comprised of any of (NH₃-H₂O₂-H₂O); (HF-H₂O₂-H₂O); or (HF-HNO₃-H₂O).; and
- The outer surface of the amorphous Si electrode is then converted to HSG.

This is discussed specifically in columns 4-10; and discussed in general in columns 1-10.

This is shown in figures 1-9.

It would have been inherent that the wet etch of the amorphous Si layer (13 b) in the process taught above would remove any natural oxide layer which has been formed onto the surface of the amorphous Si layer in previous process steps based upon the chemistry of the etchant which are used to process the amorphous Si layer. The examiner cites the case law listed below of interest to the applicant in this regard.

In re Swinehart (169 U.S.P.Q. 226 (CCPA)) and In re Best (195 U.S.P.Q. 430 (CCPA)) state that when an examiner has reasonable basis for believing that functional characteristics asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be inherent characteristics of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied upon.

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17. Claims 1, and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et. al. (1992').

Watanabe et. al. disclose a process for making a capacitor which is comprised of the following steps:

- A CVD SiO₂ layer is formed onto the surface of a Si wafer.;
- A trench is etched through the SiO₂ layer, and the top surface of the Si wafer.;
- A contact polysi layer is formed inside the trench formed in the previous process steps.;
- A P doped amorphous Si layer is formed onto the surface of the SiO₂ layer.;
- A BPSG or PSG layer is formed onto the surface of the P doped amorphous Si layer.;
- The BPSG or PSG layer is patterned to form cylindrical structures.;
- A P doped amorphous Si layer is grown on the surface of the wafer.;
- The P doped amorphous Si layer is etched back to leave a P doped amorphous Si layer surrounding the BPSG or PSG cylinder.;
- The BPSG or PSG layer is selectively dry etched to the P doped amorphous Si layer using an (HF-H₂O) vapor etchant to leave behind a cylindrical, P doped amorphous Si electrode.;
- and
- The P doped amorphous Si electrode is then treated to form an HSG layer on its outer surface.

This is discussed on pages 259-260. This is shown in figures 1-9.

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It would have been inherent that the dry etch of BPSG or PSG cylinder in the process taught above would remove any natural oxide layer which has been formed onto the surface of the amorphous Si layer in previous process steps based upon the chemistry of the etchant which are used to process the amorphous Si layer. The examiner cites the case law listed above of interest to the applicant in this regard.

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

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20. Claims 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et. al. as applied in paragraph 17 above.

Watanabe et. al. as applied in paragraph 17 above fail to disclose the following aspects of applicant's claimed invention:

-the specific usage of wet etchant of the type which is claimed by the applicant to remove the BPSG layer or the PSG cylinder selectively to the P doped amorphous Si layer

It would have been obvious to one skilled in the art to employ any of the types of wet etchant which are claimed by the applicant to selectively remove the BPSG or PSG cylinder in place of the (HF-H₂O) vapor etch step which is taught based upon the following. The usage of such wet etchants to selectively remove a BPSG or PSG layer to a Si is conventional or at least well known in the wet etching arts. (The examiner takes official notice in this regard.) Further, this would have simply provided an alternative, and at least equivalent means for conducting the selective etching of the BPSG or PSG layer to the P doped amorphous Si layer in the process taught above to those means which are specifically taught above.

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.

A handwritten signature in cursive script, appearing to read "Goudreau".

George A. Goudreau/gag

Primary Examiner

AU 1763